

# ACADEMY NEWS LETTER

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CAMOUFLAGE IN NATURE

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CALIFORNIA ACADEMY OF SCIENCES

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# CALIFORNIA ACADEMY OF SCIENCES

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## *January Announcement*

THE REGULAR JANUARY MEETING of the California Academy of Sciences will be held in ROOM 214, SIMSON AFRICAN HALL on WEDNESDAY AFTERNOON, January 7, 1942, at 3:30 o'clock. The speaker will be Dr. Robert T. Orr, Assistant Curator of the Department of Ornithology and Mammalogy of the California Academy of Sciences, whose subject will be

### SCIENTIFIC EXPLORATION IN CENTRAL IDAHO

The speaker will present a brief outline of the topography of the state of Idaho and the salient features that combine to make this region one of biological importance. A general account will be given of the results of the recent Academy expedition to the upper portion of the Clearwater River made during September, 1941.

A series of lantern slides will illustrate the various types of country in which investigations were carried on. These varied from rugged granite peaks at timberline, where mountain sheep and goats occurred, to dense Engleman spruce and giant arbor vitae forests in which bear, cougar and elk were dominant among the larger animals.

This northern Rocky Mountain region is one of considerable rainfall and has developed a heavy rain-forest type of cover. Mosses, lichens and fungi are probably as abundant here as along the humid northwest Pacific coast. Much of the region in which the Academy's work was carried on was severely burned by forest fire in 1934. Natural reforestation and the degree in which reinvasion by native birds and mammals has occurred was given considerable attention.

This is the second expedition that Dr. Orr has made to central and northern Idaho, a previous one having been carried on under the auspices of the University of California in the summer of 1932.



### PLEASE NOTE CHANGE IN TIME AND PLACE OF MEETING

THIS DEVIATION from our usual practice has been decided on to avoid difficulties of transportation that would occur in event of a blackout during an evening meeting.



### APPLICATIONS FOR MEMBERSHIP

NOTICE is hereby given to all Corporate Members that the Council at its meeting, December 19, 1941, approved the applications of Mr. Hugh S. Allen, Dr. Peter A. Ark, Dr. E. W. Beach, Mr. Reed J. Bekins, Dr. Louis B. Bishop,



Miss Eleanor S. Boone, Mr. Pal Clark, Dr. Charles E. Corbin, Mr. James Edward Cottle, Dr. Hal D. Draper, Mr. Ernest G. Dudley, Mrs. E. A. Fotheringham, Mr. William L. Gerstle, Mr. Harold F. Gray, Dr. Harold A. Hill, Dr. Frank Hinman, Miss Beatrice Howitt, Dr. Karolina B. Jump, Mrs. William Kent, Jr., Dr. Harold Kirby, Professor Hadley Kirkman, Dr. John B. Leighly, Dr. Charles B. Lipman, Dr. James B. McNaught, Mr. Albert R. Mead, Mr. G. R. Milford, Dr. Guy S. Millberry, Dr. John Luther Mohr, Professor A. R. Moore, Mr. J. Oostermeyer, Mr. Donald C. Peattie, Mr. Clarence R. Quick, Dr. Edwin W. Schultz, Mr. Leo Shapovalov, Dr. Nina Simmonds, Dr. Lewis W. Taylor, Professor Stephen Timoshenko, Mr. Paul J. Todsen, Dr. William M. Tucker, Mr. R. G. Wagenet, and Mr. S. P. Welles for MEMBERSHIP and Mr. William Schmitt for STUDENT MEMBERSHIP in the California Academy of Sciences. If no objection to the election of these applicants be received at the office of the Academy within two weeks after December 31, 1941, they will be considered elected.



#### THE ACADEMY SHIFTS TO A WARTIME BASIS

DECEMBER 8 was a busy day at the Academy. At an informal morning conference in the Director's office it was unanimously agreed that, despite the seeming improbability of wartime damage to the Academy's property, all reasonable precautions should be taken, and taken immediately. With every individual eager to do his share, before 5:00 P.M. typed air-raid instructions had been issued to every employee of the Museum and Aquarium, fire extinguishers had been inspected, boxes or sacks of sand placed on the roofs and at strategic points throughout the buildings, and last but far from least, more than 5000 type specimens of plant and animal species removed to a place of greater safety.

The Academy is seeking by every means to fulfill its obligation to the public in a time of stress. In the Museum halls there are exhibits relating to the National Defense—strategic minerals—insect-borne diseases—how to deal with an incendiary bomb. With a contribution just received from the Northern California Public Health Association an exhibit is being constructed illustrating nutritional problems of a wartime economy, and showing how families of limited income can best obtain a balanced diet in the face of rising prices.

By action of the Academy's Council, the Director has been instructed to place all of the facilities of the institution at the disposal of the United States Government. The Academy's scientific staff has been registered with the National Roster of Scientific and Specialized Personnel. The National Research Council and the National Defense Research Committee have been apprised of the scientific and research facilities of the Academy which may be of service in the present emergency.

While every proper effort will be made to maintain the normal program of the Academy, if members and friends notice any diminution in the services to which they are accustomed, it will be both considerate and reasonable if they will attribute such shortcomings to preoccupation of the staff with problems which at present are more urgent.



## BLACKOUT AT THE AQUARIUM

VARIOUS WARTIME precautions were suggested at the Aquarium, such as blacking out the luminous *Porichthys*, turning off the neon fish, and keeping the pipefish from striking matches. Instructions regarding incendiary bombs were considerably modified after an inspection of the main floor revealed nothing that would burn except the information desk and two benches in the corners.

The first blackout did reveal a few stray beams of light, notably a Mazda bulb which burns in the cage of the Gila monster to bring him the warmth and comfort of his native Arizona desert, and a similar light in the cage of a Central American boa constrictor. Now the Gila monster takes his air-raids behind an opaque screen, and visiting airmen desiring to see our boa constrictor all lighted up will have to come in through the front door between the hours of 10:00 A.M. and 4:00 P.M. like anybody else.



## ACADEMY TYPES BECOMING BLASÉ

WHEN IT WAS decided on December 8 to move the Academy's type specimens of plants and animals to a place of greater safety, there were at least two groups of types which exhibited complete indifference to the whole procedure. One of these was a group of about a thousand plants which Miss Eastwood had rescued from the Academy's old Museum on Market Street at the time of the earthquake and fire of 1906. Climbing to the top floor of the ruined building by putting her feet on the rungs of the iron railing of the shattered stairway, Miss Eastwood saved these irreplaceable specimens. She took them first to her home on Russian Hill, and when it became evident that it too would be in the path of the fire, she took them to the Presidio and left them in the care of the United States Army. Later, after the Academy had found new quarters, these plants became the nucleus of the great herbarium Miss Eastwood was to build, now numbering some 300,000 specimens.

(P.S.—Have you sent in your subscription yet to the Alice Eastwood Herbarium Fund?)



## FOSSILS UNMOVED

EVEN LESS CONCERNED if possible than the above mentioned botanical types was a certain group of fire-scarred types in the Department of Paleontology. These actually went through the fire in 1906, and subsequently were dug out of the ashes by the then Curator of the Department, Dr. F. M. Anderson, who returned them to their proper place in the collection.

As a matter of fact—in spite of lack of confidence in the good intentions of Japanese airmen—it was decided not to move the paleontological types. Heaviest of all the types to move, they also require the most room. Furthermore it was felt that, having survived through fifty or one hundred million years the vicissitudes of Nature, including earthquakes, volcanic eruptions, mountain building, glaciation, rising and subsidence of continents, inunda-



tions and withdrawals of the sea, they might reasonably be expected to withstand the hazards of the present troubled century. They have already proved themselves impervious to fire, and if they are scattered by a bomb, Dr. Anderson, now Honorary Curator of the Department, stands ready to pick them up again and put them back in their places.



## TWO ANNIVERSARIES IN QUEST OF MISS EASTWOOD

AFTER THE MANNER of "six characters in search of an author," a couple of anniversaries are looking for Miss Alice Eastwood. One of these, we can testify on the authority of "American Men of Science," is January 19, when the Academy's distinguished Curator of Botany has her eighty-third birthday, an occasion which, however important it may be to her friends, is for her only a stepping-stone into the eighty-fourth year of her perennial youth.

Another anniversary is in the offing, equally important but concerning which it is more difficult to be specific. At the meeting of the Academy's Council on December 19, it was pointed out that fifty years ago almost to the day, on December 18, 1891, the Council had authorized the employment of an Assistant in Botany. The assistant was Miss Alice Eastwood.

Miss Eastwood was at that time resident in Colorado. Just when she began her work at the Academy the record does not show. Miss Eastwood herself is either indefinite or indifferent as to the date. She apparently feels, as Mr. John McLaren is alleged to have stated when asked whether December 20 was his ninety-fifth or ninety-sixth birthday, "It makes verra, verra little difference." Researches on this matter are in progress, however, and sometime in 1942 the Academy will officially celebrate the fiftieth anniversary of Miss Eastwood's services in its Department of Botany. Watch for the date!

(P.S.—Have you sent in your subscription yet to the Alice Eastwood Herbarium Fund?)



## BOMBS AND WHAT TO DO ABOUT THEM

DEMOLITION BOMBS are something the sensible person does not worry about. He knows that they will either hit him or they will miss him, after which he may either participate in clearing up the wreckage or be a part of the wreckage that is cleared up. It is of course sensible to seek any shelter that is available, and especially to pick a place that will avoid the hazard of flying glass. The chances of being struck by a bomb are of about the same order as the chances of being struck by lightning, and the result to the individual is similar in either case. A thunderstorm, if we had never seen one, would be as terrifying as an air raid. As a matter of fact, the average citizen pursuing his daily work is far more likely to be killed by an automobile than by a bomb.

Incendiary bombs are something else again. These are often small, weighing two to four pounds apiece, and may be scattered by hundreds, starting fires over large areas. The average citizen definitely needs to know what to do in the event he finds an incendiary bomb sputtering on his roof or sizzling on his living room floor.



An incendiary bomb may be one of four general types—magnesium bombs, thermite bombs, phosphorus bombs, or bombs containing oil.

Magnesium bombs burn with a brilliant white flame, like flashlight powder. Water makes them burn more furiously, and if applied suddenly will cause them to explode. This is by reason of a reaction between the water and the burning bomb, releasing inflammable hydrogen. Magnesium bombs also burn about as well in carbon dioxide as in air.

The best way to deal with an incendiary bomb of this type is to throw sand on it with a long-handled shovel until the burning is subdued, then pick it up on the shovel and carry it outdoors. If the bomb cannot be moved in this way, a *fine spray* of water may be played on it, which will cause it to burn out more rapidly and will also wet down surrounding objects so that the fire will not spread. Remember that a magnesium bomb is immediately to be recognized by the *brilliant white flame* and white smoke.

Thermite bombs contain aluminum and iron oxide, and are impossible to extinguish, because the oxygen necessary for their combustion is supplied by the iron oxide. Burning at a high temperature (around 5400° F.) they will penetrate a limited thickness of either concrete or steel. Sand may be used to subdue the burning, and water as above to control the fire from spreading till the bomb burns out. Move the bomb out of the building if possible.

Phosphorus or oil bombs are generally of the scatter type, throwing burning material over a considerable area. Sand is also efficacious here, and chemical fire extinguishers may be used to advantage. Phosphorus pellets may be picked up on a shovel and dropped in a bucket of water. It should be remembered that phosphorus will ignite again when it gets dry.

Since the average citizen may not stop to diagnose a bomb before trying to extinguish it, the following general instructions may be kept in mind: Sand may be used on any type of incendiary bomb to subdue the burning. Then get the incendiary materials outdoors if possible, or into a bucket containing several inches of sand, using a hoe to scrape the bomb or burning pellets onto a long-handled shovel. If the bomb cannot be moved, use water to wet down the surrounding area while it burns itself out. Be prepared for it to burn through to the floor below. *Never* play a *stream* of water directly on a burning bomb; use a fine spray, as from a garden hose adjusted to spray or a soda-and-acid fire extinguisher with your thumb over the nozzle. At all times keep as far away as practicable from an incendiary bomb, and avoid looking directly at a brilliant flame unless equipped with dark goggles, as both magnesium and thermite burn brightly enough to injure the sight.



### CAMOUFLAGE IN NATURE

It is a fact well known to biologists but little known to the world at large that the principles of camouflage which were used in the First World War and which, with some modifications, are being utilized in this, were derived from the study of animal life and the way in which various species of animals, birds, reptiles, fishes and insects gain concealment in their native haunts.

On the cover of this issue of the NEWS LETTER we have a photograph of



a group in the Simson African Hall, which affords a striking illustration of the function of irregular stripes and spots in breaking up the outline of an animal and bringing it into harmony with the color and pattern of its background. The animal depicted is an African wild dog (*Lycaon pictus*), the so-called "Hunting Dog," which has habits much like the wolves of the Northern Hemisphere.

In an article on camouflage in the October number of the "Women's City Club Magazine" of San Francisco, Dr. Robert C. Miller, Director of the California Academy of Sciences, wrote in part:

Most people think of camouflage as the painting of funny stripes on battleships, and vaguely wonder how anything can be concealed by giving it the general color pattern of an escaped convict. This so-called "dazzle painting" of ships is, however, only a relatively minor phase of camouflage, which in its broader aspects may be defined as the art and science of deceiving the eyesight of an enemy or victim.

The word camouflage is a relatively recent one which was added almost simultaneously to the French and English languages during the preceding world war. The French dictionary which served this writer through college does not contain it, although its root is to be found there in the verb *camoufler* (slang), to deceive or swindle, and the reflexive *se camoufler*, to disguise oneself. A "section de camouflage" was organized in the French army late in 1915, which proved so successful in concealing gun positions and observation posts that the British followed suit early in 1916 with the organization of the British camouflage service as a unit of the Royal Engineers.

Although the word is new, and the systematic application of camouflage a recent development of military science, the practice itself is extremely old. In "Macbeth" we have an eleventh-century example which is probably more than legendary, when "Birnam wood removed to Dunsinane" in the form of branches carried by Malcolm's supporters to conceal their advance. The deadfall and the pitfall are very ancient devices, both representing weapons concealed through a careful simulation of nature. Savage tribes practice various kinds of camouflage, and in all probability primitive man invented means to conceal himself and his works for purposes of offense and defense.

But however early in human history camouflage may have been practiced with conscious intent to deceive, it was used long before that in Nature; and even today we find the best perfected examples, not on the battlefields of Europe nor in our own now familiar "war games," but among birds and animals, reptiles, insects and fish. Regardless of what weapons of offense or defense they may have developed, concealment has remained a factor of major importance to most kinds of animal life; and in the age-old struggle for existence, camouflage has been put to the acid test. The species that have survived are those whose camouflage has worked.

It is not to be assumed for a moment that the colors and patterns which seem in themselves most inconspicuous will afford the greatest degree of concealment under field conditions. The iridescent colors of the humming-bird are quite at home among the flowers which it frequents. The bizarre patterns, shapes and colors of tropical fish which appear so striking in an aquarium may afford their possessors a high degree of concealment among their native coral reefs. Few animals show more brilliant or striking coloration than a tiger as seen at the zoo or as a rug on somebody's floor; yet the tiger is famous for its terrifying ability to move unseen through the jungle, its black and yellow stripes paralleling the upright strips of vegetation.

Lighting effects must be taken account of in this connection. Every woman knows that a complexion which is at its best in a softly lighted room does not always appear to such good advantage in the white light of day; and the best that art superimposed on nature can devise looks pretty depressing in the glow of a green or yellow neon sign, or the foglights of our bridges. Camouflage must always take account of the situation in which it is to be used.

It is a popular misconception, fostered by writers, not by artists, that trees are green and skies are blue. Many a poet who has written of maidens with eyes like the skies would be surprised, not to say startled, if he actually saw one. To verify this, it is neces-



sary only to look out the window. By the same process it may be ascertained that leaves in sunshine are much more yellow than green. Many of our most brightly colored birds, the Yellow Warbler or the Golden Pileolated Warbler, for example, closely resemble foliage in sunlight.

Because light is something that cannot be controlled, camouflage that depends on pattern is in general more successful than that which depends on color. This is true both of camouflage in Nature and as practiced by man. It was not long after the introduction of "dazzle painting" of ships that submarine periscopes were provided with color filters to obviate the effect of the varied colors. Thereafter camouflage of ships became a matter of pattern rather than of color.



#### NEW FISHES RECEIVED FROM SHEDD AQUARIUM

THROUGH AN EXCHANGE of specimens with the Shedd Aquarium in Chicago, the Steinhart Aquarium has received over 500 fishes from the Mississippi Valley and the Great Lakes. Among the more striking and interesting of these are the Long-nosed Gar, the Short-nosed Gar, the Bowfin, the Common Pike, the Wall-eyed Pike, the Lake Sturgeon and the Shovel-nosed Sturgeon. The Steinhart Aquarium now has the most complete collection of fresh-water fishes in its history.



#### NO STUDENT MEETING IN JANUARY

AS THE DATE on which the January meeting of the Student Section of the Academy would normally fall comes during winter vacation, it has been decided not to hold another meeting until February. Students are of course cordially invited to Dr. Orr's lecture on the afternoon of January 7 (see announcement on page 2 of this NEWS LETTER).